

Prevalence of Hypertension and Diabetes in Severe COVID-19: A Cross-Sectional Study from Single Center, Kabul

Mohammad Zobair Wardak¹, Ahmad Farid Daanish², Ershad Ahmad Mushkani²,
Mohammad Asif Atiq²

¹Internal Medicine Specialist, Darussalam Hospital, Kabul, Afghanistan; ²Department of Pharmacology, Kabul University of Medical Sciences, Kabul, Afghanistan

Correspondence: Mohammad Asif Atiq, Department of Pharmacology, Kabul University of Medical Sciences, Kabul, Afghanistan, Tel +93777378141, Email masifatiq@gmail.com

Introduction: Previous studies have reported an association between certain medical conditions, such as hypertension and diabetes, and severe COVID-19.

Objective: To determine the prevalence of hypertension and diabetes among severe COVID-19 patients who were admitted to the only specialized center for COVID-19 in Kabul, Afghan-Japan Hospital Kabul, Afghanistan.

Methods: A cross-sectional design was utilized, including 202 patients, admitted to Afghan-Japan Hospital during the first six months of 2022. Medical records of patients tested positive for COVID-19 via Polymerase chain reaction (PCR) with oxygen saturation levels below 90% at the time of admission were included in the study. Age, sex, and the presence of hypertension and diabetes were the studied variables. Descriptive statistics were used for analysis.

Results: The median age of the patients were 63 (IQR=54.75–75) years. Males and females each accounting for 50% of the total, and the majority of the patients (50.5%) were in the age group 60–79. Of 202 patients, 143 (70.8%) had hypertension, 42 (20.8%) had diabetes, 147 patients (72.77%) had at least one of these comorbidities. Fifty-five patients (27.22%) were without diabetes and without hypertension. The prevalence of hypertension and diabetes was higher among female, ie, 57.1% and 54.5% respectively. Patients in the 40–59 year old group had the highest rate of hypertension (75.6%). The highest prevalence of diabetes was seen in the 60–79 year old group.

Conclusion: The study found a higher prevalence of hypertension in severe COVID-19 cases compared to global reports and the general adult population in Afghanistan. The relationship between hypertension and COVID-19 risk needs further investigation. The prevalence of diabetes was also higher, consistent with findings from other countries.

Keywords: severe COVID-19, comorbidity, hypertension, diabetes

Introduction

Coronavirus disease (COVID-19) is an infectious disease that is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The COVID-19 pandemic has emerged as a global health challenge, necessitating urgent attention and response worldwide. Initially, researches primarily focused on the respiratory manifestations of the virus. However, emerging evidence now suggests potential implications for cardiovascular health. Notably, certain medical conditions, such as hypertension and diabetes, have garnered significant attention due to their association with severe COVID-19. Among the critical factors under investigation are the association of specific comorbidities with covid-19. It has been reported that the proportion of patients with comorbidities was higher among those admitted to the intensive care unit (ICU) (72.2%) compared to those who were not admitted to the ICU (37.3%).¹

Hypertension and diabetes, given their high disease burdens worldwide and potential impact on COVID-19 severity, stand out as key areas of focus.^{1,2}

The prevalence of comorbidities like hypertension and diabetes has been consistently linked to severe COVID-19 across different geographical locations. However, it is important to note that the prevalence of these comorbidities can vary due to a range of other factors.^{1,2}

Numerous studies have investigated the prevalence of hypertension and diabetes in COVID-19 patients, but there is a lack of data from Afghanistan. While some studies have addressed other relevant aspects of COVID-19 in Afghanistan, we did not find any published articles on the prevalence of comorbidities in severe COVID-19 cases. Therefore, this study represents the first attempt to examine the prevalence of hypertension and diabetes among severe COVID-19 patients at a tertiary center in Afghanistan. Understanding the prevalence of these comorbidities in Afghanistan is crucial, as regional variations may exist among COVID-19 inpatients. This knowledge is essential for identifying at-risk populations, guiding clinical management, and allocating resources effectively.

Incorporating localized data on comorbidity burdens is vital for gaining insights into the specific health challenges faced by the Afghan population and for designing targeted public health responses. While numerous studies have explored this topic in various global locations, including data from Afghanistan will contribute to the expanding body of literature on COVID-19 and cardiovascular health. It will offer insights from this specific region, enhancing our understanding of the burden associated with these comorbidities. This will have positive implications for future studies by opening up possibilities for developing more effective strategies to manage and address these health concerns.

Objective

To estimate the prevalence of hypertension and diabetes among severe COVID-19 patients who were admitted to the only specialized center for COVID-19 in Kabul, Afghan-Japan Hospital Kabul, Afghanistan.

Method

A cross-sectional design based on secondary data was employed, utilizing census sampling method. The study included patients who were admitted to Afghan-Japan Hospital in Kabul during the first six months of 2022. Being a tertiary-level referral hospital and well-equipped at the national level, the hospital primarily received complex cases either through self-referral or referrals from other healthcare facilities. Out of the 15,041 patients who visited the hospital during this period, 825 were admitted for COVID-19 treatment. From these admissions, 231 patients initially tested positive for COVID-19 via Polymerase chain reaction (PCR). Among them, 202 patients with complete files were selected for inclusion in the study. The study encompassed patients from all hospital units.

Inclusion and Exclusion Criteria

The study included patients who were admitted to the hospital with a confirmed diagnosis of COVID-19, determined through polymerase chain reaction (PCR) testing. Patients with incomplete files or those who tested negative for COVID-19 on PCR testing were excluded from the study.

Definitions

Confirmed COVID-19: Patients with a positive PCR test result for COVID-19.

Severe COVID-19: Patients with oxygen saturation levels below 90% at the time of admission.

Hypertension: Defined as systolic blood pressure equal to or greater than 140 mmHg and/or diastolic blood pressure equal to or greater than 90 mmHg, or self-reported.

Diabetes (operational definition): Self-reported diabetes status based on patient history.

Data Collection

Patient demographics, medical history, clinical presentation, and laboratory findings were collected from the medical records of the study participants. The presence of hypertension and diabetes as comorbidities at the time of admission was specifically identified and recorded.

Data Analysis

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS) software. Descriptive statistics, such as frequencies and percentages, were employed to analyze the data.

Ethical Considerations

This study was conducted in accordance with ethical considerations and it was approved by the research committee of Kabul University of Medical Sciences (No 58/10.1402/5/4). The participants' informed consent was waived because of the retrospective method used in the study, and permission was obtained from the hospital director to access and analyze medical records for research purposes. Patient data confidentiality is protected by the use of de-identified information in analysis and reporting.

Results

The median age of the patients were 63 (IQR=54.75–75) years. Males and females each accounting for 50% of the total, and the majority of the patients (50.5%) were in the age group 60–79 years (Figure 1).

Of the total 202 patients, 143 (70.8%) had hypertension, 42 (20.8%) had diabetes, 147 patients (72.77%) had at least one of these comorbidities, while 38 patients (18.8%) had both diabetes and hypertension. Fifty-five patients (27.22%) did not have diabetes or hypertension (Table 1). Among the hypertensive patients, 38 (26.5%) were also diabetics.

The prevalence of hypertension and diabetes was higher among female patients, ie, 57.1% and 54.5% respectively. (Table 2).

Within the diabetic category, 90.5% (38 out of 42) of individuals also had hypertension. On the other hand, among non-diabetic patients, 65.6% (105 out of 160) had hypertension (Table 3). Among male patients with diabetes, 88.9% (16 out of 18) were also hypertensive, whereas among non-diabetic males, 59.0% (49 out of 83) had hypertension. Among female patients with diabetes, 91.7% (22 out of 24) had hypertension, whereas among non-diabetic females, 72.7% (56 out of 77) had hypertension.

Among the 15–19 year old age group, none of the three patients included in the study had hypertension. Patients in the 40–59 year old age group had the highest prevalence of hypertension (75.6%).

Overall, 20.8% (42 out of 202) of the patients were diabetic. None of the patients in the 15–39 year old age group were diabetic. The highest prevalence of diabetes was observed in the 60–79 year old age group, with 26.5% (27 out of 102) of patients in that group having diabetes (Figure 2).

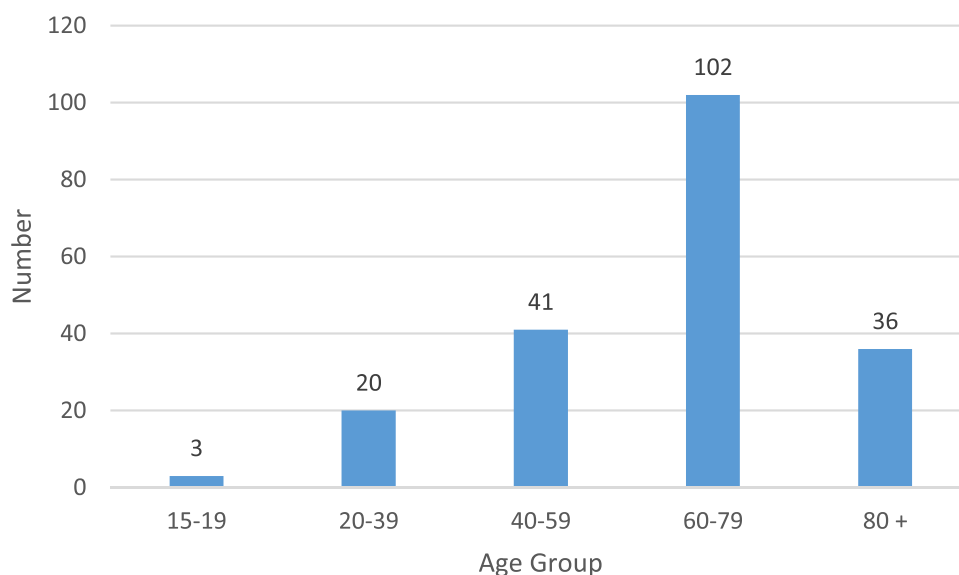


Figure 1 Age distribution of severe covid-19.

Table 1 Prevalence of Hypertension and Diabetes in Sever COVID-19

Comorbidities	N (%)
Hypertension	143(70.8)
Diabetes	42(20.8)
Either hypertension or diabetes or both	147 (72.77%)
Hypertension with diabetes	38(18.8)
Normotensive non diabetes	55(27.22)
Total	202 (100)

Table 2 Diabetes and Hypertension According to the Gender

Gender	Hypertension N=143	Diabetes N=42	No Diabetes and No hypertension N=55	Diabetes with Hypertension N=38
Male	65(45.5)	18(42.9)	34(61.8)	16(42.2)
Female	78(54.5)	24(57.1)	21(38.2)	22(57.8)

Table 3 Prevalence of Hypertension Among Diabetic COVID19 (N=42)

Blood Pressure	N (%)
Hypertension	38(90.47)
Normal blood pressure	4(9.52)

Discussion

The median age of severe COVID patients was 63 years. The finding is consistent with other studies, including a systematic review that reported an average age of 60 years in hospitalized,³ and a study involving 5700 hospitalized patients that reported a median age of 63.⁴ However, it is worth noting that some studies have reported lower age estimates, such as 53.2 years for severe patients⁵ and a median age of 52 years for severe cases.⁶ It is important to acknowledge that the mean age may vary depending on the study population and location, and it is crucial to consider the potential limitations of these studies.

In terms of age distribution, it was observed that the majority (50.5%) of the patients, ranging from 19 to 80, belonged to the 60–79 age group. This distribution differs from the age distribution of the general population in Afghanistan, where individuals aged 60–79 is about 5.6% of the population of over 14 years old (Derived from the data presented in Afghanistan Health Survey (AHS) 2018, p.28).⁷ Other studies have also reported that a higher proportion of severe cases were associated with older age groups.^{8,9}

Hypertension, the most prevalent cardiovascular comorbidity in COVID-19 patients,¹⁰ has varying prevalence rates. In this study, the prevalence of hypertension was found to be 70.8%, which is higher than previous studies from other countries. The prevalence of hypertension in hospitalized patients has been reported to be 31.2% in a case series of consecutive admitted patients without mentioning the severity of the disease,¹¹ while a study that included admitted patients with confirmed severe infection, found the prevalence of hypertension to be 56.6%.⁴ In a multicenter study of elderly COVID-19 patients which

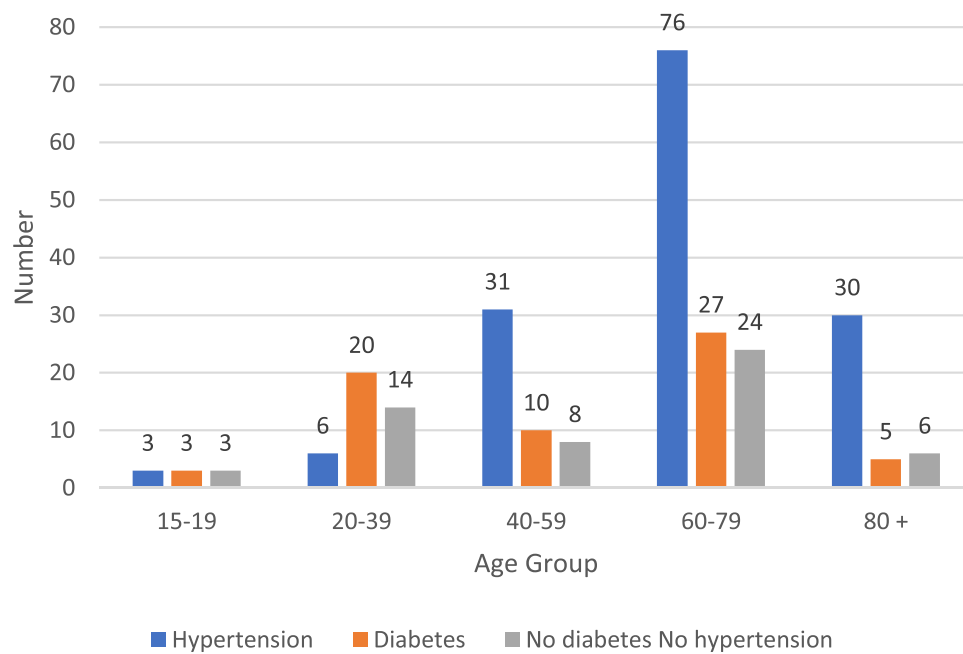


Figure 2 Age distribution of hypertension and diabetes in sever covid patients.

included 33.4% severe or critical severe cases, the prevalence of hypertension was reported to be 43.8%.¹² Further investigation is needed to study the factors that contribute to the variation in hypertension prevalence between our study and others.

According to the findings of this study, the prevalence of hypertension among severe COVID-19 cases were also higher than the estimated prevalence of hypertension in the general adult population of Afghanistan. Previous estimates have indicated that the prevalence of hypertension in the general adult population is around 32.3%¹³ and 31.9%¹⁴.

A study conducted in China also reported a higher prevalence of hypertension among severe COVID-19 cases compared to the general population, with rates of 36.5% vs 23.2%.¹⁵ These findings highlight the higher prevalence of hypertension in severe COVID-19 cases compared to the general population.

The prevalence of diabetes in severe COVID-19 illness has been the subject of numerous studies. In this study, the prevalence of diabetes was found to be 20.8%, which is similar to the pooled prevalence of diabetes in a systematic review of hospitalized cases, estimated at 21.4%.¹⁷ This prevalence is higher than the prevalence of diabetes reported in severe cases by Guan W et al, which was 16.2%.⁶ However, it is lower than the pooled prevalence of diabetes in a systematic review, estimated to be 28.9% among severe cases.¹⁶ Additionally, diabetes has been reported in about 33.8% among 5700 hospitalized patients⁴ and in 25.7% of elderly patients.¹² In the capital Kabul, the prevalence of diabetes in general adult population has been reported to be 13.2%.¹⁸ The finding indicate a higher prevalence of diabetes among severe covid cases than the general population.

The coexistence of hypertension and diabetes is also noteworthy. Hypertension is a common comorbidity in adults with diabetes worldwide, with varying prevalence rates.¹⁹ In this study, it was found that 90% of diabetic patients with severe COVID-19 had hypertension, in contrast to 52.38% of non-diabetic patients.

Among individuals with diabetes, the prevalence of hypertension was found to be over 90%, while among non-diabetic individuals, the prevalence was 65.6%. This indicates a higher prevalence of hypertension among individuals with diabetes. Furthermore, the prevalence of hypertension was observed to increase with age in both individuals with and without diabetes.

However, it is important to acknowledge the limitations of the study, which include the use of secondary data from medical records and limited generalizability to other populations or regions. Furthermore, relying solely on self-reported diabetes status without verifying blood glucose levels may impact the accuracy of the reported prevalence of diabetes.²⁰

However, it has been found that self-reported diabetes is sufficiently valid to be used in large-scale, population-based epidemiological studies.¹⁵

Our study aimed solely to assess the prevalence of diabetes and hypertension in a specific population. To maintain simplicity and clarity of objective, we excluded additional data, such as outcomes or treatment.

Conclusion

The study revealed a higher prevalence of hypertension among severe COVID-19 patients compared to previously published reports worldwide and the general population in the same age categories in Afghanistan. Whether hypertension was a risk factor for COVID-19 or if the latter caused hypertension still needs to be answered. The prevalence of diabetes was also higher than that of the general population of the country, although it aligns with findings from studies conducted in other countries.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Yang J, Zheng YA, Gou X, et al. Prevalence of comorbidities and its effects in patients infected with SARS-CoV-2: a systematic review and meta-analysis. *Inter J Infect Dis.* 2020;94:91–95. doi:10.1016/j.ijid.2020.03.017
2. Barrera FJ, Shekhar S, Wurth R, et al. Prevalence of diabetes and hypertension and their associated risks for poor outcomes in Covid-19 patients. *J Endo Soc.* 2020;4(9):bvaa102. doi:10.1210/jendso/bvaa102
3. Athanasios A, Daley I, Patel A, Oyesanmi O, Desai P, Frunzi J. Cerebrovascular Accident and SARS-CoV-19 (COVID-19): a Systematic Review. *Eur Neurol.* 2021;84(6):418–425. doi:10.1159/000517403
4. Richardson S, Hirsch JS, Narasimhan M, et al. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. *JAMA.* 2020;323(20):2052–2059. doi:10.1001/jama.2020.6775
5. Chen X, Zheng L, Ye S, et al. Research on influencing factors and classification of patients with mild and severe COVID-19 symptoms. *Front Cell Infect Microbiol.* 2021;11:670823. doi:10.3389/fcimb.2021.670823
6. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med.* 2020;382(18):1708–1720. doi:10.1056/NEJMoa2002032
7. Afghanistan Health Survey (AHS). RMNCAH Directorate MoPH; 2019. Available from: <https://rmncah-moph.gov.af/blog/2019/03/02/ahs-2018/>. Accessed April 23, 2024.
8. Jin S, An H, Zhou T, et al. Age cohorts stratified according to age-distributions of COVID-19 morbidity statistics identify uniquely age-dependent CD3+ CD8+ T-cell lymphocytopenia in COVID-19 patients without comorbidities on admission. *Aging.* 2021;13(6):7713. doi:10.18632/aging.202691
9. Herrera-Esposito D, de Los Campos G. Age-specific rate of severe and critical SARS-CoV-2 infections estimated with multi-country seroprevalence studies. *BMC Infect Dis.* 2022;22(1):311. doi:10.1186/s12879-022-07262-0
10. Peng M, He J, Xue Y, Yang X, Liu S, Gong Z. Role of Hypertension on the Severity of COVID-19: a Review. *J Cardiovasc Pharmacol.* 2021;78(5):e648–e655. doi:10.1097/FJC.0000000000001116
11. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *Jama.* 2020;323(11):1061–1069. doi:10.1001/jama.2020.1585
12. Guo T, Shen Q, Guo W, et al. Clinical characteristics of elderly patients with COVID-19 in Hunan Province, China: a multicenter, retrospective study. *Gerontology.* 2020;66(5):467–475. doi:10.1159/000508734
13. Saeed KM. Burden of hypertension in the Capital of Afghanistan: a cross-sectional study in Kabul City, 2015. *Int J Hyperten.* 2017;2017:3. doi:10.1155/2017/3483872
14. Neupane D, McLachlan CS, Sharma R, et al. Prevalence of hypertension in member countries of South Asian Association for Regional Cooperation (SAARC): systematic review and meta-analysis. *Medicine.* 2014;93(13):e74. doi:10.1097/MD.0000000000000074
15. Huang S, Wang J, Liu F, et al. COVID-19 patients with hypertension have more severe disease: a multicenter retrospective observational study. *Hypertens Res.* 2020;43(8):824–831. doi:10.1038/s41440-020-0485-2
16. Li R, Shen M, Yang Q, et al. Global diabetes prevalence in COVID-19 patients and contribution to COVID-19–related severity and mortality: a systematic review and meta-analysis. *Diabetes Care.* 2023;46(4):890–897. doi:10.2337/dc22-1943
17. Saeed KM, Asghar RJ, Sahak MN, Ansari J. Prevalence and risk factors associated with diabetes mellitus among Kabul citizens—Afghanistan, 2012. *Int J Diabetes Dev Countr.* 2015;35:297–303. doi:10.1007/s13410-014-0270-3
18. Colosia AD, Palencia R. Prevalence of hypertension and obesity in patients with type 2 diabetes mellitus in observational studies: a systematic literature review. *Diabetes Metabol Syndr Obes.* 2013;17:327–338. doi:10.2147/DMSO.S51325
19. Keel S, Foreman J, Xie J, Van Wijngaarden P, Taylor HR, Dirani M. The prevalence of self-reported diabetes in the Australian national eye health survey. *PLoS One.* 2017;12(1):e0169211. doi:10.1371/journal.pone.0169211
20. Li HL, Fang J, Zhao LG, et al. Personal characteristics effects on validation of self-reported type 2 diabetes from a cross-sectional survey among Chinese adults. *J Epidemiol.* 2020;30(11):516–521. doi:10.2188/jea.JE20190178

Infection and Drug Resistance

Dovepress

Publish your work in this journal

Infection and Drug Resistance is an international, peer-reviewed open-access journal that focuses on the optimal treatment of infection (bacterial, fungal and viral) and the development and institution of preventive strategies to minimize the development and spread of resistance. The journal is specifically concerned with the epidemiology of antibiotic resistance and the mechanisms of resistance development and diffusion in both hospitals and the community. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/infection-and-drug-resistance-journal>